(19) World Intellectual Property Organization

International Bureau





(43) International Publication Date 9 September 2005 (09.09.2005)

PCT

(10) International Publication Number WO 2005/083706 A1

(51) International Patent Classification⁷: G11B 20/10

(21) International Application Number:

PCT/KR2005/000526

(22) International Filing Date: 26 February 2005 (26.02.2005)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 10-2004-0013016

26 February 2004 (26.02.2004) KR

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,

GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

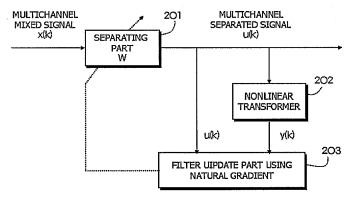
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: THE METHODS ANDAPPARATUS FOR BLIND SEPARATION OF MULTICHANNEL CONVOLUTIVE MIXTURES IN THE FREQUENCY DOMAIN



(57) Abstract: A method and apparatus is disclosed for performing blind source separation using frequency-domain normalized multichannel blind deconvolution. In an embodiment of this invention, the multichannel mixed signals are formed as frames of *N* samples, which consist of *r* consecutive blocks of *M* samples. The frames of mixed signals are separated using separating filters in the frequency domain in an overlap-save manner using a discrete Fourier transform (DFT). The separated signals are then converted back into the time domain using the inverse DFT to be applied to a nonlinear function. The cross-power spectra between separated signals and nonlinear-transformed signals are computed and are normalized by the power spectra of separated signals and the power spectra of nonlinear-transformed signals to have

flat spectra. The invention then applies the time domain constraint to preserve the first *L* cross-correlations. These alias-free normalized cross-power spectra are further constrained by nonholonomic constraints. The invention then computes natural gradient by convolving alias-free normalized cross-power spectra with separating filters. After the length of separating filters is constrained to *L*, separating filters are updated using the natural gradient and normalized to have unit norm. The terminating conditions are checked to see if separating filters converged.

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